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(54) **A method for manufacturing an absorbent composite in a sanitary product, and an absorbent composite manufactured with the method**

Verfahren zur Herstellung eines zusammengesetzten absorbierenden Materials für absorptionsfähige Hygieneprodukte, und nach dem Verfahren hergestelltes zusammengesetztes absorbierendes Material

Procédé pour la fabrication d'un composite absorbant pour un article absorbant hygiénique, et un composite absorbant fabriqué selon ce procédé

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(56) References cited:
EP-A- 0 269 380
EP-A- 0 306 262
WO-A-93/06804
DE-A- 4 305 271
US-A- 4 551 378
US-A- 4 732 809

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Description

Field of the Invention

[0001] The present invention relates to a method for manufacturing an absorbent composite in a sanitary product, wherein at least one liquid absorbing layer is formed by means of the dry forming technique, which absorbing layer comprises natural fibres, such as wood fibres, and plastic fibres mixed with one another, and superabsorbent material, and which is bound by means of heat. The present invention also relates to an absorbent composite in a sanitary product, manufactured with the method, which absorbent composite comprises at least one dry-formed absorbing layer, which comprises natural fibres, such as wood fibres, and plastic fibres mixed with one another, and superabsorbent material, and which is bound by means of heat, and at least one liquid dispersive material layer on the absorbing layer.

Background of the Invention

[0002] In manufacturing dry formed sanitary products, an absorbent composite is formed by means of the dry forming technique from natural fibres, to which is added a binding material or binding fibres, which bind the formed material web into a porous material layer by the action of heat. The absorbent composite may consist of several superimposed layers according to desired thickness. Superabsorbent material is often added locally to the absorbent composite to improve absorption capacity. Such absorbent composites are disclosed for instance in WO publications 93/06804 and 94/10957.

[0003] Material composites manufactured in this manner are used for manufacturing different diapers, incontinence products and sanitary towels. Recently, the size of such products has been reduced in order that they would be as inconspicuous as possible, and as, on the other hand, the object has been to achieve as good an absorption capacity as possible, attempts have been made to solve the problem by increasing the amount of the superabsorbent material. Such products have typically consisted of two material layers, a liquid wicking layer and a liquid absorbing layer. Both layers usually consist of natural fibres or a mixture of natural fibres and binding fibres. In addition, superabsorbent material is usually added to a layer which faces away from the user. A great disadvantage of such products is the fact that the layer which faces the user remains damp, as a result of which a relatively thick liquid-repellent cover stock must be added to the final product in order that the product would feel dry against the skin of the user.

[0004] Another disadvantage of such products is the fact that liquid is absorbed rather slowly through the structure due to the porous fibre-like structure, as a result of which only a part of the absorption capacity of a sanitary product is utilized effectively in practice.

[0005] DE-4305271-A discloses a composite non-woven for use as a covering for an absorbent body, which consists of a bulky nap of crinkled fibres or filaments which are bonded to a support non-woven.

Summary of the Invention

[0006] The object of the present invention is to provide a method for manufacturing such an absorbent composite in a sanitary product which has very good surface dryness characteristics, a good liquid wicking and absorbing capacity, and a small size.

[0007] According to the invention, there is provided a method of manufacturing an absorbent composite for a sanitary product, which comprises the steps of:

forming at least one liquid absorbing layer (14) by means of a dry forming technique, said absorbing layer comprising natural fibres and plastic fibres mixed with one another, and superabsorbent material (15); and
heat binding the absorbing layer;

characterised in that
the method further comprises the step of dry forming onto the absorbing layer (14), before the step of heat binding the absorbing layer, at least one layer of fibres, which become bound and crimped to form a liquid dispersive material layer (13) during the heat binding step.

[0008] Preferably, the lower surface of the absorbing layer, before it is bound with heat, is hot calendered with a roll to achieve a desired liquid wicking capacity.

[0009] The preferred absorbent composite of the invention is thus produced essentially in such a manner that the absorbent composite comprises material layers for wicking liquid and for absorbing liquid and an extremely porous and soft cover stock, which quickly lets liquids pass through to lower layers by retaining its dryness and separating the damp layers from the user of the product.

[0010] The absorbent composite of the invention is characterised in that the liquid dispersive material layer is formed by dry forming a layer of fibres which can be crimped by the action of heat, and that the fibres of the absorbing layer and the fibres for the formation of the liquid dispersive material layer are bound, and the fibres for the formation of the liquid dispersive material layer become crimped, in a single heating step. The final result is thus an absorbent composite which is extremely absorbent and small in size and which has no particle or other concentrations which would deteriorate mechanical durability.

[0011] The other preferred embodiments of the method of the invention are characterized by what is disclosed in the claims presented below. The other embodiments of the absorbent composite in a sanitary product according to the invention are also characterized by what is disclosed in the claims presented below.

Brief Description of the Figures

[0012] The method of the invention and the absorbent composite in a sanitary product, manufactured by means thereof, will be described in more detail in the following with reference to the accompanying drawing, in which

Figure 1 shows a production line for the absorbent composite in a sanitary product according to the invention,
Figures 2a - 2c show eccentric bicomponent fibres, and
Figure 3 shows a cross section of the absorbent composite in a sanitary product according to the invention.

Detailed Description of the Preferred Embodiments

[0013] Figure 1 shows a dry forming line, in which a material web 2 is formed on a wire 1 in two stages by means of two formers 3 and 4. The liquid absorbing layer is formed by the former 3 from a mixture of natural fibres, such as wood fibres, and plastic fibres, and superabsorbent material, and the cover stock is formed by the former 4 from fibres crimping by the action of heat. A mixture of air and fibre is blown into the formers, which extend transversely across the wire over its entire width, this mixture being mixed and screened to form an even material layer onto the wire 1 moving below in accordance with prior art. It is possible to dispose as many formers as the desired thickness of the material web 2 requires, whereby the thickness of the material web is gradually increased by means of formers arranged successively on the same production line until the desired thickness is achieved. The proportion of wood fibres to plastic fibres in material web layers produced by different formers may thus vary.

[0014] The wood fibres are preferably relatively long-fibred mechanical or chemical pulp, and the plastic fibres of the liquid absorbing layer may be any suitable heat bindable fibres, for instance bicomponent fibres, the core of which is polypropylene and the coat of which is polyethene.

[0015] Superabsorbent particles or superabsorbent fibres are added to the material web 2 either by means of a separate sprinkling device 5 or by adding them to the fibre material of the former 3. Suitable superabsorbent materials are for instance activated carbon, activated clay, silica gels, CMC-based superabsorbents and cross-linked polyacrylates. The superabsorbent may also be in a liquid form, spraying nozzles being thus used instead of a sprinkling device for spraying for instance acrylic acid monomer in aqueous dispersion onto the material web. The monomers are cross-linked by means of heat and a suitable radical, the superabsorbent thus binding the fibres together for its part. The amount of plastic fibres can thus be decreased in this layer, or they can be omitted altogether as unnecessary.

[0016] The percentage limits of different particles in the absorbing layer may be for instance as follows: wood fibre (chemical pulp fibre) 10 - 90%, plastic fibre 0-70%, and superabsorbent particles 0 - 90%. The grammage of the cover stock may be for instance 15 - 100 g/m^2 and that of the entire absorbent composite for instance 80 - 1000 g/m^2.

[0017] After the forming stage, the lower surface of the absorbing layer is calendered with a hot roll 8 to achieve a desired liquid wicking capacity. This calendering of the lower surface of the absorbing layer takes place when the material web is being sucked against the wire 11 which moves round a suction box 10. Patterning which improves the spreading of liquid to desired areas of the product can be produced either by means of a smooth calender roll and a patterned wire or by means of an embossing calender roll and a smooth wire. It has been shown that liquid spreads faster, up to a certain limit, in a denser fibre layer as compared with a more porous fibre layer. This is based on the fact that more densely packed fibres have a greater liquid spreading capacity than fibres which are farther apart from one another. By utilizing this characteristic and providing the liquid with "passages" along which it is capable of travelling faster to all parts of the product, the absorption capacity of the product is utilized in an optimum manner. After the calendering, the material web is bound with heat in a dryer 6. Both the fibres of the absorbing layer and those of the cover stock as well as the superabsorbent material included in the absorbing layer are thus bound together at a time, be the superabsorbent material either fibre-like, particle-like or liquid.

[0018] Figure 2a shows an eccentric bicomponent fibre 10 crimped by means of heat. Figure 2b shows a cross section of the fibre appearing in Figure 2a as taken along the line A - A shown in Figure 2a. It appears from the cross section shown in Figure 2b that the core 11 of the eccentric fibre 10 is located eccentrically with respect to a coat 12 in such a manner that the core extends to the outer rim. Figure 2c shows a cross section of a centrically eccentric bicomponent fibre 17, the core 18 of which is also located eccentrically in a coat 19, but in such a manner that it does not extend to the outer rim. The cores 11 and 18 of the fibres 10 and 17, respectively, are preferably polypropylene, and the coats 12 and 19 are polyethene. In binding the eccentric bicomponent fibres according to Figures 2a - c by means of heat, they are considerably curled or crimped, forming a great number of binding points, whereby the result is an extremely porous and elastic fibre layer. The thickness of eccentric bicomponent fibres used in the cover stock is preferably 0.8 - 12 dTex and the length 3 -12 mm.

[0019] Figure 3 shows a cross section of the absorbent composite in a sanitary product according to the invention, the cross section showing a cover stock 13, which consists exclusively of eccentric bicomponent fibres, and an absorbing layer 14, which consists of a mix-

ture of wood fibres and plastic fibres, and of superabsorbent material 15. In Figure 3, the superabsorbent material is shown as particle-like. If a fibre-like or liquid superabsorbent material were used instead of the particles, this material would not be appreciably distinguished from the rest of the structure of the absorbing layer, wherefore these alternatives are not separately shown.

[0020] It appears from the cross section according to Figure 3 that the entire absorbent composite 9 is essentially one seamless layer, one surface of which is a cover stock consisting of eccentric bicomponent fibres and the other surface of which is an absorbing layer containing superabsorbent material. The thickness of the layers can be varied and adjusted at the forming stage, the only essential aspect being that the layers are formed on the same line and bound together during one stage. The final product, formed from the fibre layer, is cut to a suitable size and its lower surface is possibly covered with a liquid impermeable plastic layer. Other possibly required finishing procedures depend on the use of the final product.

[0021] The method of the invention for manufacturing an absorbent composite in a sanitary product as well as the absorbent composite in a sanitary product manufactured by means thereof have been described above by means of only some exemplifying embodiments, and it will be apparent to one skilled in the art that the different embodiments of the invention are not restricted to the examples presented above but that they may vary within the scope of the claims presented below.

Claims

1. A method of manufacturing an absorbent composite for a sanitary product, which comprises the steps of:

   forming at least one liquid absorbing layer (14) by means of a dry forming technique, said absorbing layer comprising natural fibres and plastic fibres mixed with one another, and superabsorbent material (15); and
   heat binding the absorbing layer;

   characterised in that
   the method further comprises the step of dry forming onto the absorbing layer (14), before the step of heat binding the absorbing layer, at least one layer of fibres, which become bound and crimped to form a liquid dispersive material layer (13) during the heat binding step.

2. A method according to claim 1,
   characterised in that
   the lower surface of the absorbing layer (14), before it is bound with heat, is hot calendered with a roll (8) to achieve a desired liquid wicking capacity.

3. A method according to claim 2,
   characterised in that
   the hot calendering of the lower surface of the absorbing layer is performed with a patterned roll (8) to produce patterning which improves the spreading of liquid in the absorbing layer.

4. A method according to claim 2,
   characterised in that
   the hot calendering of the lower surface of the absorbing layer is performed with a smooth roll (8), whereafter a final calendering of the absorbing layer is performed with a patterned roll to produce patterning which improves the spreading of liquid in the absorbing layer.

5. A method according to any of claims 1 to 4, wherein the liquid absorbing layer (14) is formed by a former (3) from natural fibres and plastic fibres mixed with one another,
   characterised in that
   the superabsorbent material (15) is added in particle or fibrous form by means of a separate sprinkling device (5).

6. A method according to any of claims 1 to 4, wherein the liquid absorbing layer (14) is formed by a former (3) from natural fibres and plastic fibres mixed with one another,
   characterised in that
   the superabsorbent material (15) is added in particle or fibrous form to the fibre material of the former (3).

7. A method according to any of claims 1 to 4, wherein the liquid absorbing layer (14) is formed by a former (3) from natural fibres and plastic fibres mixed with one another,
   characterised in that
   the superabsorbent material (15) is added in particle or fibrous form both to the fibre material of the former (3) and by means of a separate sprinkling device (5).

8. A method according to any of claims 1 to 4,
   characterised in that
   the superabsorbent material (15) is added in liquid form to the absorbing layer (14) immediately after the layer has been dry formed.

9. A method according to any of claims 1 to 8,
   characterised in that
   the fibres, which become bound and crimped to form the liquid dispersive material layer (13) during the heat binding step, comprise eccentric bicomponent fibres (10), in which the core (11) extends to the outer rim.

10. A method according to any of claims 1 to 8, characterised in that the fibres, which become bound and crimped to form the liquid dispersive material layer (13) during the heat binding step, comprise eccentric bicomponent fibres (17), in which the core (18) does not extend to the outer rim.

11. An absorbent composite for a sanitary product, which absorbent composite comprises

at least one dry-formed absorbing layer (14) which comprises natural fibres and plastic fibres mixed with one another, and superabsorbent material (15), and which is bound by means of heat, and
at least one liquid dispersive material layer (13) on the absorbing layer (14),

characterised in that
the liquid dispersive material layer (13), is formed by dry forming a layer of fibres (10; 17) which can be crimped by the action of heat, and that the fibres of the absorbing layer (14) and the fibres (10; 17) for the formation of the liquid dispersive material layer (13) are bound, and the fibres (10, 17) for the formation of the liquid dispersive material layer become crimped, in a single heating step.

12. An absorbent composite according to claim 11, characterised in that the lower surface (16) of the absorbing layer (14) is provided with patterning improving the spreading of liquid.

13. An absorbent composite according to claim 12, characterised in that the lower surface (16) of the absorbing layer (14) is hot calendered to produce patterning improving the spreading of liquid.

14. An absorbent composite according to any of claims 11 to 13, characterised in that the superabsorbent material (15) comprises superabsorbent particles or fibres which form a discrete layer within the absorbing layer.

15. An absorbent composite according to any of claims 11 to 13, characterised in that the superabsorbent material (15) comprises superabsorbent particles or fibres which are evenly distributed throughout the absorbing layer.

16. An absorbent composite according to any of claims 11 to 13, characterised in that the superabsorbent material (15) comprises some superabsorbent particles or fibres which are evenly distributed throughout the absorbing layer and some superabsorbent particles and fibres which form a discrete layer within the absorbing layer.

17. An absorbent composite according to any of claims 11 to 13, characterised in that the superabsorbent material (15) is added to the fibres of the absorbing later (14) as a liquid precursor and then cross-linked.

18. An absorbent composite according to any of claims 11 to 17, characterised in that the liquid dispersive material layer (13) comprises eccentric bicomponent fibres (10), in which the core (11) extends to the outer rim.

19. An absorbent composite according to any of claims 11 to 17, characterised in that the liquid dispersive material layer (13) comprises eccentric bicomponent fibres (17), in which the core (18) does not extend to the outer rim.

Patentansprüche

1. Verfahren zur Herstellung eines absorbierenden zusammengesetzten Materials für ein Hygieneprodukt mit den folgenden Schritten:

Formen von zumindest einer flüssigkeitsabsorbierenden Schicht (14) mittels einer Trockenformtechnik, wobei die absorbierende Schicht natürliche Fasern und damit gemischte Plastikfasern und hochabsorbierendes Material (15) aufweist; und

Binden der absorbierenden Schicht mittels Hitze;

dadurch gekennzeichnet, dass
das Verfahren außerdem den folgenden Schritt aufweist: das Trockenformen von zumindest einer Schicht aus Fasern auf die absorbierende Schicht (14), bevor der Schritt des Bindens der absorbierenden Schicht durch Hitze ausgeführt wird, wobei die Fasern während des Hitzebindungsschritts gebunden und gekräuselt werden, um eine flüssigkeitszerstreuende Materialschicht (13) zu bilden.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass die untere Oberfläche der absorbierenden Schicht (14) mit einer Rolle (8) heiß kalendriert wird, bevor

sie mittels Hitze gebunden wird, um eine erwünschte Flüssigkeitsdurchlässigkeitskapazität zu erzielen.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, dass das Heißkalendrieren der unteren Oberfläche der absorbierenden Schicht mit einer gemusterten Rolle (8) ausgeführt wird, um ein Muster herzustellen, welches das Verteilen der Flüssigkeit in der absorbierenden Schicht verbessert.

4. Verfahren nach Anspruch 2, dadurch gekennzeichnet, dass das Heißkalendrieren der unteren Oberfläche der absorbierenden Schicht mit einer welchen Rolle (8) ausgeführt wird, und dass danach ein abschließendes Kalendrieren der absorbierenden Schicht mit einer gemusterten Rolle durchgeführt wird, um ein Muster herzustellen, welches das Verteilen der Flüssigkeit in der absorbierenden Schicht verbessert.

5. Verfahren nach einem der Ansprüche 1 bis 4, wobei die flüssigkeitsabsorbierende Schicht (14) mittels eines Formers (3) aus natürlichen Fasern und damit gemischten Plastikfasern gebildet wird, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) in partikelartiger oder faseriger Form mittels einer separaten Berieselungsvorrichtung (5) aufgebracht wird.

6. Verfahren nach einem der Ansprüche 1 bis 4, wobei die flüssigkeitsabsorbierende Schicht (14) mittels eines Formers (3) aus natürlichen Fasern und damit gemischten Plastikfasern gebildet wird, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) in partikelartiger oder faseriger Form dem Fasermaterial des Formers (3) hinzugefügt wird.

7. Verfahren nach einem der Ansprüche 1 bis 4, wobei die flüssigkeitsabsorbierende Schicht (14) mittels eines Formers (3) aus natürlichen Fasern und damit gemischten Plastikfasern gebildet wird, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) in partikelartiger oder faseriger Form sowohl dem Fasermaterial des Formers (3) hinzugefügt wird als auch mittels einer separaten Berieselungsvorrichtung (5) aufgebracht wird.

8. Verfahren nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) in flüssiger Form der absorbierenden Schicht (14) hinzugefügt wird, und zwar unmittelbar, nachdem die Schicht trockengeformt worden ist.

9. Verfahren nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, dass die Fasern, die während des Bindungsschritts gebunden und gekräuselt werden, um die flüssigkeitszerstreuende Schicht (13) zu bilden, exzentrische Zweikomponentenfasern (10) aufweisen, in welchen der Kern (11) sich bis zum äußeren Rand erstreckt.

10. Verfahren nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, dass die Fasern, welche während des Hitzebindungsschritts gebunden und gekräuselt werden, um die flüssigkeitszerstreuende Schicht (13) zu bilden, exzentrische Zweikomponentenfasern (17) aufweisen, in welchen sich der Kern (18) nicht bis zum äußeren Rand erstreckt.

11. Absorbierendes zusammengesetztes Material für ein Hygieneprodukt, welches enthält:

zumindest eine trockengeformte absorbierende Schicht (14), die natürliche Fasern und damit gemischte Plastikfasern aufweist, sowie hochabsorbierendes Material, und welche mittels Hitze gebunden wird, und

zumindest eine flüssigkeitszerstreuende Schicht (13) auf der absorbierenden Schicht (14),

dadurch gekennzeichnet, dass die flüssigkeitszerstreuende Schicht (13) durch Trockenformen einer Schicht von Fasern (10, 17) gebildet wird, die mittels Hitze gekräuselt werden können, und dass die Fasern der absorbierenden Schicht (14) und die Fasern (10, 17) zur Bildung der flüssigkeitszerstreuenden Schicht (13) gebunden werden, und die Fasern (10, 17) zur Bildung der flüssigkeitszerstreuenden Materialschicht gekräuselt werden, und zwar in einem einzigen Erhitzungsschritt.

12. Absorbierendes zusammengesetztes Material nach Anspruch 11, dadurch gekennzeichnet, dass die untere Oberfläche (16) der absorbierenden Schicht (14) mit einem Muster versehen ist, welches die Verteilung der Flüssigkeit verbessert.

13. Absorbierendes zusammengesetztes Material nach Anspruch 12, dadurch gekennzeichnet, dass die untere Oberfläche (16) der absorbierenden Schicht (14) heiß kalendriert ist, um ein Muster herzustellen, das das Verteilen der Flüssigkeit verbessert.

14. Absorbierendes zusammengesetztes Material

nach einem der Ansprüche 11 bis 13, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) hochabsorbierende Partikel oder Fasern aufweist, welche eine bestimmte Schicht innerhalb der absorbierenden Schicht bilden.

15. Absorbierendes zusammengesetztes Material nach einem der Ansprüche 11 bis 13, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) hochabsorbierende Partikel oder Fasern aufweist, die innerhalb der absorbierenden Schicht gleichmäßig verteilt sind.

16. Absorbierendes zusammengesetztes Material nach einem der Ansprüche 11 bis 13, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) einige hochabsorbierende Partikel oder Fasern aufweist, welche gleichmäßig in der absorbierenden Schicht verteilt sind, und einige hochabsorbierende Partikel und Fasern, die innerhalb der absorbierenden Schicht eine bestimmte Schicht bilden.

17. Absorbierendes zusammengesetztes Material nach einem der Ansprüche 11 bis 13, dadurch gekennzeichnet, dass das hochabsorbierende Material (15) den Fasern der absorbierenden Schicht (14) als flüssiger Vorgänger hinzugefügt und dann quervernetzt wird.

18. Absorbierendes zusammengesetztes Material nach einem der Ansprüche 11 bis 17, dadurch gekennzeichnet, dass die flüssigkeitszerstreuende Materialschicht (13) exzentrische Zweikomponentenfasern (10) aufweist, in welchen der Kern (11) sich bis zum äußeren Rand erstreckt.

19. Absorbierendes zusammengesetztes Material nach einem der Ansprüche 11 bis 17, dadurch gekennzeichnet, dass die flüssigkeitszerstreuende Materialschicht (13) exzentrische Zweikomponentenfasern (17) aufweist, in welchen der Kern (18) sich nicht bis zum äußeren Rand erstreckt.

Revendications

1. Procédé de fabrication d'un produit composite absorbant pour un article hygiénique, qui comprend les étapes de :

   formation d'au moins une couche d'absorption de liquide (14), au moyen d'une technique de formation à sec, ladite couche absorbante comprenant des fibres naturelles et des fibres de matière plastique qui sont mélangées entre elles, ainsi qu'une matière superabsorbante (15) ; et
   liaison thermique de la couche absorbante ;

   caractérisé en ce que
   le procédé comprend, en outre l'étape de formation à sec sur la couche absorbante (14), avant l'étape de liaison thermique de la couche absorbante, d'au moins une couche de fibres, qui sont liées et frisées, pendant l'étape de liaison thermique, pour constituer une couche de matière de dispersion de liquide (13).

2. Procédé selon la revendication 1,
   caractérisé en ce que la face inférieure de la couche absorbante (14), avant que celle-ci ne soit fixée par la chaleur, est calandrée à chaud au moyen d'un rouleau (8) afin d'obtenir la capacité désirée d'effet de mèche pour le liquide.

3. Procédé selon la revendication 2,
   caractérisé en ce que le calandrage à chaud de la face inférieure de la couche absorbante est effectué au moyen d'un rouleau gaufreur (8) servant à produire des motifs permettant d'améliorer l'étalement du liquide dans la couche absorbante.

4. Procédé selon la revendication 2,
   caractérisé en ce que le calandrage à chaud de la face inférieure de la couche absorbante est effectué au moyen d'un rouleau lisse (8), après quoi le calandrage final de la couche absorbante est effectué par un rouleau gaufreur, afin de produire des motifs permettant d'améliorer l'étalement du liquide dans la couche absorbante.

5. Procédé selon l'une quelconque des revendications 1 à 4, dans lequel la couche d'absorption de liquide (14) est formée par un formeur (3), à partir de fibres naturelles et de fibres de matière plastique, qui sont mélangées entre elles,
   caractérisé en ce que la matière superabsorbante (15) est ajoutée, sous la forme de particules ou de fibres, au moyen d'un dispositif de projection (5) séparé.

6. Procédé selon l'une quelconque des revendications 1 à 4, dans lequel la couche d'absorption de liquide (14) est formée par un formeur (3), à partir de fibres naturelles et de fibres de matière plastique, qui sont mélangées entre elles,
   caractérisé en ce que la matière superabsorbante (15) est ajoutée, sous la forme de particules ou de fibres, à la matière en fibres fournie par le formeur (3).

7. Procédé selon l'une quelconque des revendications 1 à 4, dans lequel la couche d'absorption de liquide (14) est formée par un formeur (3), à partir de fibres naturelles et de fibres de matière plastique, qui sont mélangées entre elles,

caractérisé en ce que la matière superabsorbante (15) est ajoutée, sous la forme de particules ou de fibres, à la fois à la matière en fibres fournie par le formeur (3) et au moyen d'un dispositif de projection (5) séparé.

8. Procédé selon l'une quelconque des revendications 1 à 4,

caractérisé en ce que la matière superabsorbante (15) est ajoutée, sous une forme liquide, à la couche absorbante (14) immédiatement après la formation à sec de cette couche.

9. Procédé selon l'une quelconque des revendications 1 à 8,

caractérisé en ce que les fibres, qui sont liées et frisées au cours de l'étape de liaison thermique pour constituer la couche de matière de dispersion de liquide (13), comprennent des fibres (10) à deux éléments constitutifs excentrés, dans lesquelles le coeur (11) s'étend jusqu'au bord extérieur.

10. Procédé selon l'une quelconque des revendications 1 à 8,

caractérisé en ce que les fibres, qui sont liées et frisées au cours de l'étape de liaison thermique pour constituer la couche de matière de dispersion de liquide (13), comprennent des fibres (17) à deux éléments constitutifs excentrés, dans lesquelles le coeur (18) ne s'étend pas jusqu'au bord extérieur.

11. Produit composite absorbant pour un article hygiénique, lequel produit composite absorbant comprend :

au moins une couche absorbante (14), formée à sec et comprenant des fibres naturelles et des fibres de matière plastique mélangées entre elles, ainsi qu'une matière superabsorbante (15), avec liaison par voie thermique, et
au moins une couche de matière de dispersion de liquide (13) située sur la couche absorbante (14),

caractérisé en ce que la couche de matière de dispersion de liquide (13) est obtenue par formation à sec d'une couche de fibres (10 ; 17), qui peuvent être frisées sous l'effet de la chaleur, et en ce que les fibres de la couche absorbante (14) et les fibres (10 ; 17), destinées à constituer la couche de matière de dispersion de liquide (13), sont liées tandis que les fibres (10, 17) destinées à constituer la couche de matière de dispersion de liquide sont frisées, en une seule étape de chauffage.

12. Produit composite absorbant selon la revendication 11,

caractérisé en ce que la face inférieure (16) de la couche absorbante (14) est pourvue de motifs permettant d'améliorer l'étalement du liquide.

13. Produit composite absorbant selon la revendication 12,

caractérisé en ce que la face inférieure (16) de la couche absorbante (14) est calandrée à chaud afin de produire des motifs permettant d'améliorer l'étalement du liquide.

14. Produit composite absorbant selon l'une quelconque des revendications 11 à 13,

caractérisé en ce que la matière superabsorbante (15) comprend des particules ou des fibres superabsorbantes, qui constituent une couche discrète à l'intérieur de la couche absorbante.

15. Produit composite absorbant selon l'une quelconque des revendications 11 à 13,

caractérisé en ce que la matière superabsorbante (15) comprend des particules ou des fibres superabsorbantes, qui sont régulièrement réparties dans la totalité de la couche absorbante.

16. Produit composite absorbant selon l'une quelconque des revendications 11 à 13,

caractérisé en ce que la matière superabsorbante (15) comprend une certaine quantité de particules ou de fibres superabsorbantes, qui sont régulièrement réparties dans la totalité de la couche absorbante, et une certaine quantité de particules et de fibres superabsorbantes, qui constituent une couche discrète à l'intérieur de la couche absorbante.

17. Produit composite absorbant selon l'une quelconque des revendications 11 à 13,

caractérisé en ce que la matière superabsorbante (15) est ajoutée aux fibres de la couche absorbante (14), en tant que précurseur liquide, avec ensuite réticulation.

18. Produit composite absorbant selon l'une quelconque des revendications 11 à 17,

caractérisé en ce que la couche de matière de dispersion de liquide (13), comprend des fibres (10) à deux éléments constitutifs excentrés, dans lesquelles le coeur (11) s'étend jusqu'au bord extérieur.

19. Produit composite absorbant selon l'une quelconque des revendications 11 à 17,

caractérisé en ce que la couche de matière

de dispersion de liquide (13) comprend des fibres (17) à deux éléments constitutifs excentrés, dans lesquelles le coeur (18) ne s'étend pas jusqu'au bord extérieur.

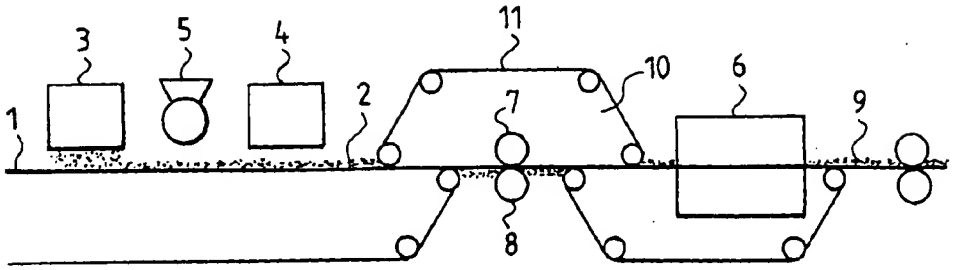

FIG. 1

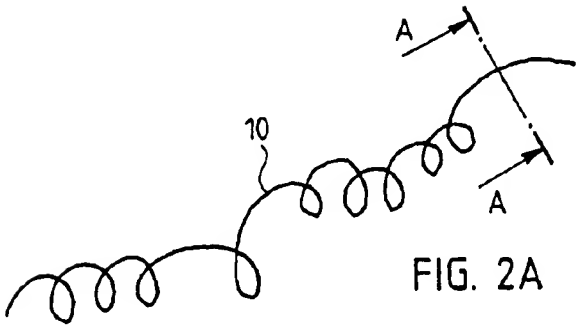

FIG. 2A

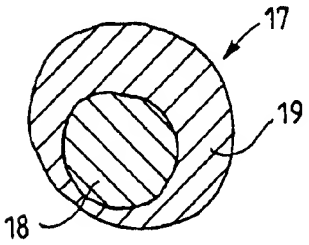

FIG. 2C

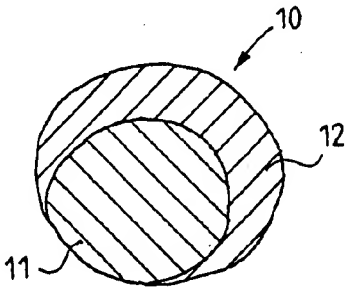

FIG. 2B

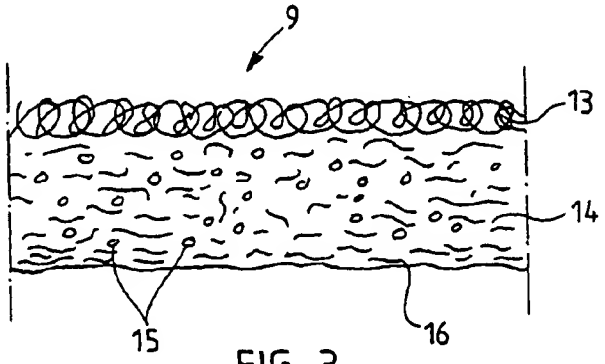

FIG. 3